

EXHIBIT 225

**IN THE UNITED STATES DISTRICT COURT FOR
THE NORTHERN DISTRICT OF GEORGIA
ATLANTA DIVISION**

DONNA CURLING, et al.

Plaintiff,

vs.

BRIAN P. KEMP, et al.

Defendant.

**CIVIL ACTION FILE NO.:
1:17-cv-2989-AT**

DECLARATION OF PHILIP B. STARK

PHILIP B. STARK hereby declares as follows:

Qualifications and Background

1. I am Professor of Statistics and Associate Dean of Mathematical and Physical Sciences at the University of California, Berkeley, where I am also a faculty member in the Graduate Program in Computational Data Science and Engineering; a co-investigator at the Berkeley Institute for Data Science; principal investigator of the Consortium for Data Analytics in Risk; director of Berkeley Open Source Food; and affiliated faculty of the Simons Institute for the Theory of Computing, the Theoretical Astrophysics Center, and the Berkeley Food Institute. Previously, I was Chair of the Department of Statistics and Director of the Statistical Computing Facility.
2. I have published more than one hundred and ninety articles and books. I have served on the editorial boards of archival journals in physical science, Applied Mathematics, Computer

22. The Board of Advisors of the U.S. Election Assistance Commission (EAC) passed a resolution in 2018 recommending that the EAC “not certify any system that does not use voter-verifiable paper as the official record of voter intent.”³
23. Merely using paper ballots to conduct an election does not ensure that results are correct. The paper must actually be used in an appropriate way to check the reported results and to correct the results if they are wrong. Suitable “post-election audits” that manually inspect random samples of paper ballots can detect and correct incorrect electoral outcomes.
24. The NAS report states, “each state should require a comprehensive system of post-election audits of processes and outcomes.” NAS Report, at 8. “Audits of election outcomes should include manual examination of statistically appropriate samples of paper ballots cast.” NAS Report, at 9.
25. Elections should be conducted in a way that gives the public convincing evidence that reported election outcomes are correct. This is the principle of “evidence-based elections.”⁴
26. It is my understanding that since the security breach of the Kennesaw State University Center for Election Systems server, there has been no forensic examination or remediation of voting system components, including many thousands of pieces of computerized election equipment indirectly connected to that server. As a result, in Georgia, the accuracy and trustworthiness of election results are in particular peril compared to most states: the need for paper ballots and rigorous post-election audits is urgent. The paperless systems currently deployed in Georgia simply cannot provide trustworthy evidence that reported election outcomes are correct.

³ <https://www.eac.gov/documents/2018/04/27/resolution-2018-03-auditability-of-voter-intent-passed-10-8-4-advisors-resolution-page/> Last accessed 9 September 2018.

⁴ Stark, P.B., and D.A. Wagner, 2012. Evidence-Based Elections. *IEEE Security and Privacy*, 10, 33–41. Preprint: <https://www.stat.berkeley.edu/~stark/Preprints/evidenceVote12.pdf>

27. A “risk-limiting audit” (RLA)⁵ is a particular approach to catching and correcting incorrect election outcomes before they become official. A RLA is any post-election procedure that offers the following statistical guarantee: If a full manual tally of the complete voter-verifiable paper trail would show a different electoral outcome, there is a known, pre-determined minimum chance that the procedure will lead to a full manual tally.
28. If the procedure does lead to a full manual tally, the result of that manual tally replaces the reported outcome, thereby correcting it.
29. Here, “outcome” means the political result: the candidate(s) or position that won, or the determination that a run-off is needed, not the exact vote totals.
30. The maximum chance that the procedure will not lead to a full manual tally if that tally would show a different outcome is called the *risk limit*. Equivalently, the risk limit is the largest chance that the audit will fail to correct an outcome that is incorrect, where “incorrect” means that a full manual tally of the voter-verifiable paper trail would find different winner(s).
31. For instance, a RLA with a risk limit of 5% has at least a 95% chance of requiring a full manual tally, if that tally would show an outcome that differs from the reported outcome.
32. The NAS Report recommends RLAs: “States should mandate risk-limiting audits prior to the certification of election results.” NAS Report, at 9. “Risk-limiting audits can efficiently establish high confidence in the correctness of election outcomes—even if the equipment

⁵ Risk-limiting audits have been endorsed by the Presidential Commission on Election Administration, the American Statistical Association, the League of Women Voters, Common Cause, Verified Voting Foundation, and many other organizations concerned with election integrity. They are required by law in Colorado and Rhode Island, and have been tested in California, Ohio, and Denmark. They were developed in 2007; the first publication is Stark, P.B., 2008. Conservative Statistical Post-Election Audits, *Ann. Appl. Statistics*, 2, 550–581. Reprint. Since then, there have been extensions for other social choice functions (e.g., proportional representation, see Stark, P.B., and V. Teague, 2014. Verifiable European Elections: Risk-limiting Audits for D’Hondt and Its Relatives, *JETS: USENIX Journal of Election Technology and Systems*, 3, 18–39. https://www.usenix.org/system/files/jets/issues/0301/overview/jets_0301_stark_update_9-10-15.pdf), for auditing any number of contests simultaneously, for different types of voting equipment, etc. For a general but still somewhat technical introduction, see Stark, P.B., and M. Lindeman, A Gentle Introduction to Risk-Limiting Audits, *IEEE Security and Privacy*, 10, 42–49, doi:10.1109/MSP.2012.56

used to cast, collect, and tabulate ballots to produce the initial reported outcome is faulty.”

NAS Report, at 100.

33. The US Election Assistance Commission (EAC) recently issued a white paper on the history, importance, and conduct of RLAs.⁶

34. It is crucial to base post-election audits on voter-verifiable paper records; to ensure that those records include every validly cast vote exactly once, and no others (checking the determination of eligibility, in particular); to ensure that those records remain complete and intact from the moment they are cast through the audit; and to assess the evidence that they are trustworthy. Absent affirmative evidence that the paper trail is a trustworthy record of voter intent—that it accurately reflects the intent of every voter who legitimately cast a ballot in the contests under audit, and no others—the audit might simply confirm the incorrect outcome. The process of assessing the trustworthiness of the paper trail is called a *compliance audit*.

35. There are many methods for conducting risk-limiting audits, involving different ways of drawing samples of ballots and different demands on the voting system and on auditors. For instance, a full handcount is a risk-limiting audit, with a risk limit of zero. But by inspecting randomly selected ballots and using appropriate statistical methods, it is possible to conduct risk-limiting audits much more efficiently—when the electoral outcome is correct. Below, I discuss *ballot-polling* RLAs, a particular approach that Georgia could implement in time for the 2018 mid-term elections.

36. RLAs require manually inspecting voter-verifiable paper ballots. In particular, digital images of ballots are not a trustworthy record of voter intent.

⁶ https://www.eac.gov/assets/1/6/Risk-Limiting_Audits_-_Practical_Application_Jerome_Lovato.pdf Last accessed 9 September 2018.

A handwritten signature in black ink, appearing to read "Phil B. Stark", is positioned above a horizontal line.

Philip B. Stark